Binding Energy and Stability of Nucleus

If $E_B > 0$, i.e +ve, the nucleus is stable and energy from outside is to be supplied to disrupt the nucleus into its constituents seperately.

If, however, $E_B < 0$, i.e −ve, the nucleus is unstable and will disintegrate of itself. The E_B − value is a measure of the stability of the nucleus.

More the E_B, more the stability

Binding fraction $(f_B) = E_B / A$(Nucleon)

Mass defect : $_1H = 1.0078254$ u
$_2H = 2.0141024$ u
$_2He = 4.0026034$ u, $_8O^{16} = 15.9949154$ and so on and so forth.

$$\Delta M' = M(A,Z) - A$$

$M(A,Z)$ → Atomic mass (measured) in u

A → Mass No. of nuclei

eg. Mass defect of $_2He^4 = 4.0026034 - 4 = +0.0026034$

Packing Fraction

$$f = \frac{\text{mass defect per nucleon}}{} = \frac{\Delta M'}{A} = \frac{M(A,Z) - A}{A}$$

$$M(A,Z) = A(1+f)$$